

Renewable Energy Question 11: *What are the current and projected relative costs per kilowatt hour for existing and new builds for wind, solar, hydro, biomass, landfill gas, coal, natural gas, nuclear, and other sources? How would those differ if the generation source was placed in another jurisdiction electrically tied to Michigan?*

Executive Summary

1. Costs for renewable energy can be higher or lower than new non-renewable generation depending on the technology. The projected cost of energy, as provided in EIA estimates, is only one consideration when comparing different sources of generation.
 2. Levelized costs of energy are driven by many factors including: (1) capital costs, (2) capacity factors, and (3) fuel costs and other cost drivers, which can lead to cost differences per kilowatt hour for the same technology between Michigan and the other Great Lakes states. Additional transmission costs could be incurred to transport electricity from out-of-state generation sources to in-state customers.
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1. **Please refer to Renewable Energy Question 3 for a more detailed discussion.**
2. **Levelized costs of energy are driven by many factors including (1) capital costs, (2) capacity factors, and (3) fuel costs and other cost drivers, which can lead to cost differences per kilowatt hour for the same technology between Michigan and the other Great Lakes states. Additional transmission costs could be incurred to transport electricity from out-of-state generation sources to in-state customers.**

Levelized costs of energy are driven by many factors. Three of the most important factors that drive the regional differences are:

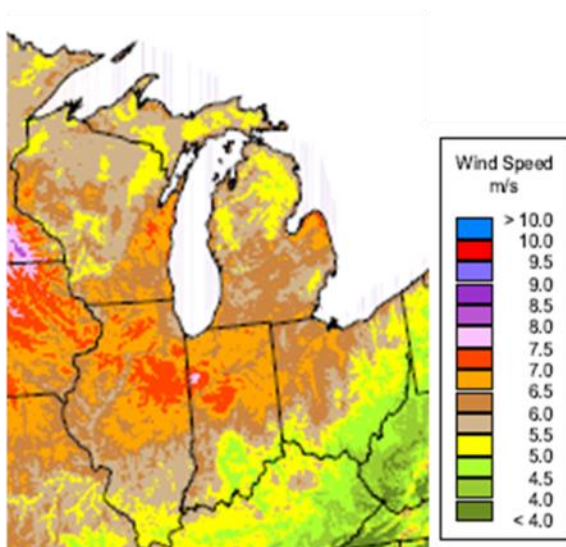
Capital costs: the EIA report *Updated Capital Cost Estimates for Electricity Generation Plants* provided capital cost estimates of various generation technologies in different U.S. locations. Capital costs of both renewable and conventional generation technologies in Michigan are either lower than or in line with the average in other Great Lakes states that are electrically tied to Michigan (Illinois, Indiana, Ohio and Wisconsin). Capital costs of different generation technologies are discussed in more detail in Renewable Energy Question 10.

Capacity factors: capacity factors of the same generation technology can vary significantly between Michigan and the other Great Lakes states. Capacity factors of renewable generation plants such as wind and solar are constrained by the availability of the fuel sources. Exhibits I and II demonstrate the difference in wind and solar resource potential in the Great Lakes area. Michigan's wind resource is about average compared to the other Great Lakes states; Illinois has a few spots that have noticeably better wind than Michigan. Michigan's solar resource has the lowest potential among the Great Lakes states. Furthermore, it is important to understand

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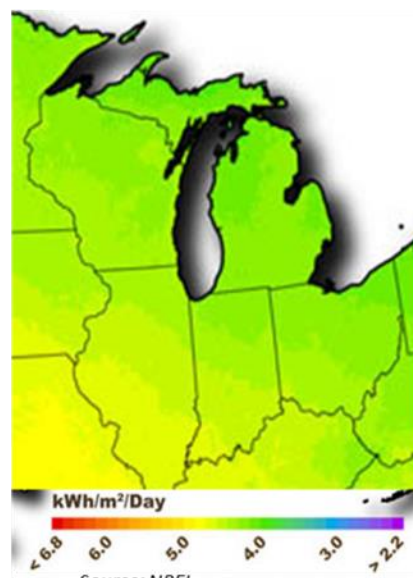
that the resource potential maps do not consider potential constraints such as siting and transmission upgrade costs.

Exhibit I Annual Average Wind Speed at 80 Meter



Source: AWS Truewind, NREL

Exhibit II Photovoltaic Solar Resource

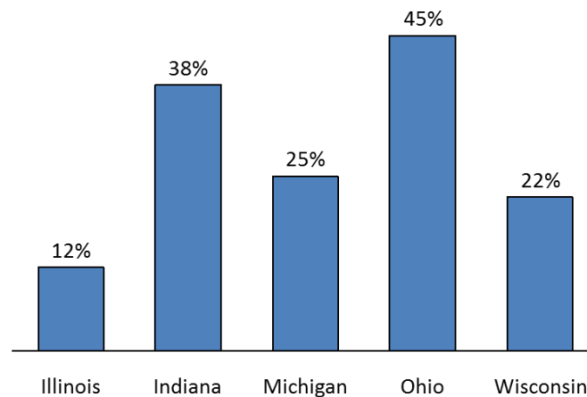


Source: NREL

Capacity factors of conventional technologies such as coal and natural gas plants depend heavily on the load shape and the existing resource mix in the areas where new capacity is installed. As demonstrated by Exhibit III, the average capacity factors of natural gas combined cycle plants in 2011 vary from 12% in Illinois to 45% in Ohio, resulting from different market and system conditions in different states. The historical data provide a general indication of the difference in capacity factors. The actual capacity factor of a new power plant may deviate substantially from the historical levels based on a multitude of unpredictable factors (e.g., fuel prices, system load).

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Exhibit III 2011 Average Capacity Factors of NGCC Plants in Great Lakes States (%)



Source: DTE analysis on EIA-923 detailed data

Fuel costs: delivered costs of fuel vary considerably among the Great Lakes states as illustrated in Exhibits IV and V. Notably, Michigan has the highest delivered cost of coal among the Great Lakes states.

Exhibit IV Delivered Costs of Coal to Electric Power Plants in 2011

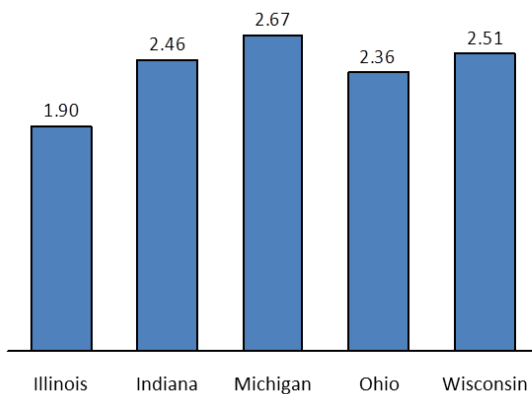
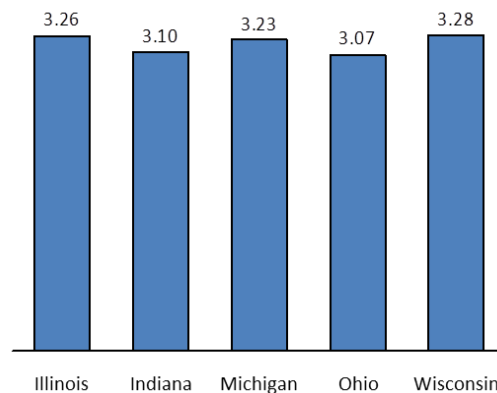


Exhibit V Delivered Costs of Natural Gas To Electric Power Plants in 2011



Source: EIA

In conclusion, to determine the regional differences in levelized costs of energy, a study needs to be commissioned to take into consideration the various factors that could potentially drive the differences between Michigan and the other Great Lakes states.

Moreover, if new generation plants are placed outside of Michigan and used to supply electricity to Michigan customers, additional transmission costs could be incurred in order to transport the electricity to in-state customers.